

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1. (currently amended) A magnetic thin film consisting of an iron carbide film, said iron carbide film comprising an α' phase as a principal phase and at least carbon and iron as constituent elements,

wherein said iron carbide film has a body-centered tetragonal structure and a c-axis constitutes an axis of hard magnetization and a c-plane constitutes a plane of easy magnetization, and

wherein the α' phase is a martensite phase, and

wherein said axis of hard magnetization constitutes a direction which is perpendicular to the film surface and said plane of easy magnetization constitutes a direction, which is horizontal to the film surface.

2. (original) A magnetic thin film according to claim 1, wherein said iron carbide film consists of a single α' phase.

3. (original) A magnetic thin film according to claim 1, wherein a diffraction peak from the (002) plane of the α' phase is observed as a principal peak by means of an X-ray diffraction method or an electron diffraction method in said iron carbide film.

4. (canceled)

5. (previously presented) A magnetic thin film according to claim 1, wherein said iron carbide film has a magnetic anisotropy energy required when the spontaneous magnetization deflects toward the direction of the c-axis from the c-plane, which is two orders of magnitude larger than the magnetic anisotropy energy required when spontaneous magnetization deviates from the direction of the axis of easy magnetization in the c-plane.

6. (canceled)

7. (original) A magnetic thin film according to claim 1, wherein said iron carbide film consists of not less than 0.5 atomic % and not more than 15 atomic % of carbon and iron as the balance.

8. (original) A magnetic thin film according to claim 1, wherein said iron carbide film consists of not less than 1 atomic % and not more than 12 atomic % of carbon and iron as the balance.

9. (original) A magnetic thin film according to claim 1, wherein said iron carbide film contains cobalt as a third element.

10. (original) A magnetic thin film according to claim 1, wherein said iron carbide film contains nitrogen as a third element.

11. (previously presented) A magnetic thin film according to claim 1, wherein said iron carbide film is formed on a surface of a thin film having an interatomic distance that is within $4\text{\AA} \pm 10\%$ of said iron carbide film.

12. (previously presented) A magnetic thin film according to claim 11, wherein the principal element constituting said thin film has lattice constants that are within $4\text{\AA} \pm 10\%$ of those of said iron carbide film.

13. (original) A magnetic thin film according to claim 11, which is an iron film having the (200) plane as the surface.

14. (original) A magnetic thin film according to claim 11, wherein the principal element constituting said thin film is at least one element selected from Ag, Au, Pd, Pt, Rh, Al, Ir, and Ru.

15. (original) A magnetic thin film according to claim 1, wherein said iron carbide film has negative magnetocrystalline anisotropy constants K_u .

16-24 (canceled).

25. (previously presented) A magnetic head comprising the magnetic thin film consisting of an iron carbon film of claim 1 as at least a portion of a magnetic pole material of a recording head.

26. (original) A magnetic head according to claim 25, wherein said recording head is for longitudinal magnetic recording.

27. (original) A magnetic head according to claim 25, wherein said recording head is for perpendicular magnetic recording.

28. (original) A magnetic recording device comprising the magnetic head of claim 25, capable of magnetically recording information on a moving magnetic recording medium using said magnetic head.

29. (original) A magnetic recording device according to claim 28, wherein said magnetic recording medium has an axis of easy magnetization in a direction which is parallel with or perpendicular to a substrate.

30. (previously presented) A magnetic device comprising a hard magnetic film which serves as a recording layer constituting a longitudinal magnetic recording medium, and a magnetic thin film consisting of the iron carbide film of claim 1, which is formed on said hard magnetic film.

31. (original) A magnetic device according to claim 30, wherein an intermediate layer consisting of a non-magnetic film is formed between said magnetic thin film and said hard magnetic film.

32. (previously presented) A magnetic device comprising a hard magnetic film which serves as a recording layer constituting a perpendicular magnetic recording medium, and a

magnetic thin film consisting of the iron carbide film of claim 1, which is formed under said hard magnetic film.

33. (original) A magnetic device according to claim 32, wherein an intermediate layer consisting of a non-magnetic film is formed between said magnetic thin film and said hard magnetic film.

34. (previously presented) A magnetic device comprising the magnetic thin film consisting of an iron carbide film of claim 1 used as a soft magnetic layer constituting an exchange-spring magnet.

35. (previously presented) A magnetic device comprising the magnetic thin film consisting of an iron carbide film of claim 1 used as a soft magnetic layer constituting a spin transistor magnet.

36. (previously presented) A magnetic device comprising the magnetic thin film consisting of an iron carbide film of claim 1 used as at least a portion of a transmission line constituting a magnetic sensor.

37. (previously presented) A magnetic device comprising the magnetic thin film consisting of an iron carbide

film of claim 1 used as at least a portion of a transmission line constituting a high frequency passive device.

38. (previously presented) A magnetic device comprising the magnetic thin film consisting of an iron carbide film of claim 1 used as at least a portion of a magnetic film constituting a micro transformer or a micro inductor.

39. (previously presented) A magnetic thin film consisting of an iron carbide film, said iron carbide film comprising a martinsite phase as a principal phase and at least carbon and iron as constituent elements,

wherein said iron carbide film has a body-centered tetragonal structure and a c-axis constitutes an axis of hard magnetization and a c-plane constitutes a plane of easy magnetization, and

wherein said plane of easy magnetization of the magnetic film is a direction horizontal to the film.

40. (previously presented) The magnetic thin film according to claim 1, wherein the film has a saturation magnetic flux density of 1.5 T or greater and a coercive force of 2 Oe or less.

41. (previously presented) The magnetic thin film according to claim 40, wherein the film has a saturation magnetic flux density of 2.0 T or greater and a coercive force of 1 Oe or less.

42. (new) A magnetic thin film consisting of an iron carbide film, said iron carbide film comprising an α' phase as a principal phase and at least carbon and iron as constituent elements,

wherein said iron carbide film has a body-centered tetragonal structure and a c-axis constitutes an axis of hard magnetization and a c-plane constitutes a plane of easy magnetization, said axis of hard magnetization constitutes a direction which is perpendicular to the film surface and said plane of easy magnetization constitutes a direction, which is horizontal to the film surface, and

wherein said iron carbide film has negative magnetocrystalline anisotropy constants K_u .

43. (new) A magnetic thin film according to claim 42, wherein said iron carbide film consists of not less than 0.5 atomic % and not more than 15 atomic % of carbon and iron as the balance.

44. (new) A magnetic thin film according to claim 42, wherein said iron carbide film consists of not less than 1 atomic % and not more than 12 atomic % of carbon and iron as the balance.

45. (new) A magnetic thin film according to claim 42, wherein said iron carbide film contains cobalt as a third element.

46. (new) A magnetic thin film according to claim 42, wherein said iron carbide film contains nitrogen as a third element.

47. (new) A magnetic thin film according to claim 42, wherein said iron carbide film is formed on a surface of a thin film having an interatomic distance that is within $4\text{\AA} \pm 10\%$ of said iron carbide film.

48. (new) A magnetic thin film according to claim 42, wherein the principal element constituting said thin film has lattice constants that are within $4\text{\AA} \pm 10\%$ of those of said iron carbide film.

49. (new) A magnetic thin film according to claim 48, which is an iron film having the (200) plane as the surface.

50. (new) A magnetic thin film according to claim 48, wherein the principal element constituting said thin film is at least one element selected from Ag, Au, Pd, Pt, Rh, Al, Ir, and Ru.